

Development of Manufacturing Methods for Low-Cost, High-Temperature Sensors Applicable to Hypersonic Research, Phase I

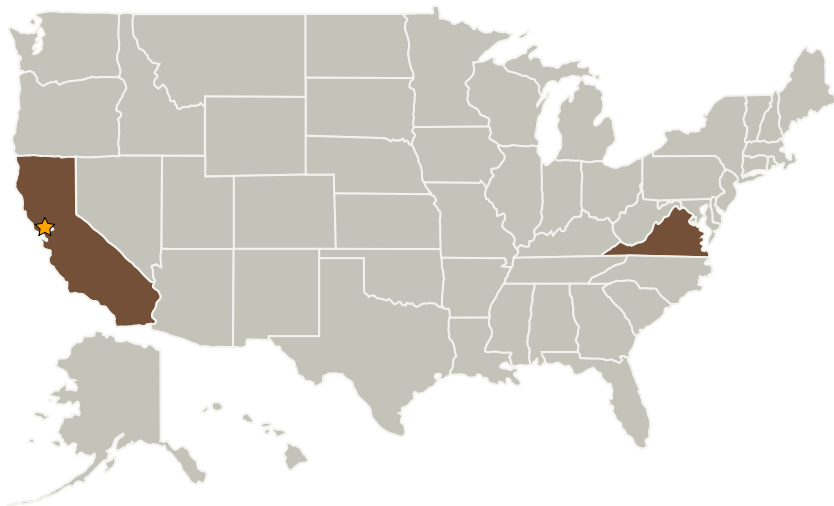
Completed Technology Project (2007 - 2007)



Project Introduction

Routine installation and use of high-temperature optical sensors for characterization of advanced materials critical to NASA hypersonic programs are difficult due to the fundamental difficulties of integrating very diverse materials into a reliable, manufacturable sensor. Sensors based on high-temperature optical fibers (including sapphire fibers) have been developed through extensive research; however, little advancement has been made with regard to achieving cost-effective sensors that can be employed in large numbers. Currently, the materials of the mounting site, the materials of the sensor coupon, the fiber itself, sensor assembly methods and the optical interrogation methods have limited compatibility, resulting in each application becoming a custom installation. Recent demonstrations at Virginia Tech, under NASA hypersonic program funding, of advanced Fracture-Release coupon structures, novel connectorization techniques, and improved assembly methods have enabled more rapid fabrication of high-temperature sapphire fiber sensors well-suited to instrumentation of advance materials in hypersonic research. Prime Research, teaming with Virginia Tech, proposes to leverage these previous demonstrations to improve the manufacturability and ease-of-use of sapphire fiber strain gages, and to modify the assembly methods to permit their use with Prime Research's patented spinel-clad sapphire fibers, which have improved optical properties over unclad sapphire fibers.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Prime Photonics, LC	Supporting Organization	Industry	Blacksburg, Virginia

Primary U.S. Work Locations

California	Virginia
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
 - └ TX14.3 Thermal Protection Components and Systems
 - └ TX14.3.5 Thermal Protection System Instrumentation